

Appl. No. : 09/737,439
Filed : December 13, 2000

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a trench formed in the silicon substrate beneath the bridges, to provide an air gap between the inductive loop and the silicon substrate.

REMARKS

In response to the Office Action mailed January 16, 2002, Applicant respectfully requests the Examiner to reconsider the above-captioned application in view of the above amendments and the following comments.

Claims 1-4 and 8 have been amended. The amendments to the claims are clarifications of explicit or inherent features, and do not narrow the scope of protection. Therefore, the claim amendments do not introduce any new matter.

Claim 13 has been added and is supported by original Claim 8 and Figures 3 and 6. As a result of the amendments listed above, Claims 1-13 are pending in this application. Claims 9-12 have been withdrawn from consideration.

The specific changes to the amended claims and specification are shown on a separate set of pages attached hereto and entitled VERSION WITH MARKINGS TO SHOW CHANGES MADE, which follows the signature page of this Amendment. On this set of pages, the insertions are double underlined while the ~~deletions are struck through~~.

Discussion of Objections to the Drawings

The Examiner notes that Figures 1 and 2 should be designated by a legend such as – Prior Art—because only that which is old is illustrated. In reply, Applicant has designated Figures 1 and 2 as “Prior Art.”

Discussion of Rejections under 35 U.S.C. § 102(b)

The Examiner has rejected Claims 1-8 under 35 U.S.C. § 102(b) as being anticipated by Abidi, et al (U.S. Patent No. 5,539,241). The Examiner asserts that Abidi discloses all of the elements recited in Claims 1-8. However, the claimed invention is not anticipated by the Abidi reference as discussed below.

Abidi does not disclose the structure of the apertures recited in Claim 1

Presently pending Claim 1 recites, among other things, "a plurality of apertures in the oxide layer beneath the inductive loop." That is, the inductive loop is located above the apertures. However, Abidi does not show the apertures beneath the inductive loop as recited in Claim 1. As clearly seen in Figures 2 and 7, openings (80) discussed in the Abidi reference are not located beneath the inductor (12), but instead are located around the inductor (12).

In addition, referring to the disclosure, column 6, lines 47-50, Abidi discloses that the orientation of the openings (80) is rotated 45° with respect to the x-y coordinate grid. This means that the openings (80) are not positioned beneath the inductor (12). Furthermore, referring to the disclosure, column 3, lines 20-30, and Figures 6b-6c and 9, Abidi shows that the pit (14) which does not correspond to openings (80) is positioned under the inductor (12).

Abidi does not disclose the structure of the bridges recited in Claim 1

Presently pending Claim 1 recites, among other things, "a plurality of bridges provided by portions of the oxide layer between inner and outer regions of the oxide layer, respectively within and without the inductive loop." That is, the bridges of Claim 1 are located between the inner region within the inductive loop and the outer region without (outside) the inductive loop. However, Abidi does not disclose the structure of the bridges as recited in Claim 1. Referring to the disclosure, column 3, lines 20-30, and Figure 2, the bridge structure (18) of Abidi is located only outside (without) the inductor (12). Please note that reference numerals 74a and 76a in Figure 2 are lead lines that connect the inductor (12) to other circuitry, and do not constitute parts of the inductor (12) (column 5, lines 29-50).

In view of the above discussion, Claim 1 is neither anticipated by nor would have been made obvious by the Abidi reference. Claims 2-8 depend from base Claim 1 and further define additional technical features. Thus, the dependent claims are also patentable.

Therefore, withdrawal of the rejections is respectfully requested.

Discussion of New Claim

The new Claim 13 has been added in this paper. Claim 13 comprises all of the limitations of Claim 1 and further includes the limitations "each aperture forming an underpass to

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a plurality of segments of the inductive loop.” Therefore, Applicant believes that the new Claim 13 is also patentably distinguished from the prior art.

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CONCLUSION

In view of the foregoing amendments and remarks, it is respectfully submitted that the present application is in condition for allowance. If the Examiner has any remaining concerns which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the indicated telephone number.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: 4/15/02

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Please amend the title of the invention as follows:

Integrated circuit inductor structure for reducing distributed capacitance to substrate

IN THE CLAIMS:

Please amend Claims 1-4 and 8 as follows:

1. (AMENDED) An integrated circuit inductor, the integrated circuit having a silicon substrate and an oxide layer on the silicon substrate, the inductor comprising:
 - an inductive loop deposited on the oxide layer;
 - a plurality of apertures in the oxide layer beneath the inductive loop;
 - a plurality of bridges adjacent the apertures and provided by portions of the oxide layer between an inner region and an outer region of the oxide layer, respectively within and without the inductive loop, the loop being supported on the bridges; and
 - a trench formed in the silicon substrate beneath the bridges, to provide an air gap between the inductive loop and the silicon substrate.
2. (AMENDED) The integrated circuit inductor as claimed in Claim 1, wherein the apertures and the bridges extend generally radially ~~of~~ from the inner region.
3. (AMENDED) The integrated circuit inductor as claimed in Claim 1, wherein the trench extends circumferentially ~~of~~ around the inner region.
4. (AMENDED) The integrated circuit inductor as claimed in Claim 2, wherein the trench extends circumferentially ~~of~~ around the inner region.
8. (AMENDED) ~~An~~ The integrated circuit inductor as claimed in ~~claim~~ Claim 1, wherein the oxide layer includes an underpass connection in one of the bridges from a peripheral connection ~~for one~~ to another end of the inductor to its inner end .

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